

SEQUENCE LISTING

<110> E. I. DU PONT DE NEMOURS AND COMPANY

<120> PLANT 1-DEOXY-D-XYLULOSE 5-PHOSPHATE REDUCTOISOMERASE

<130> BB1297

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<151> 1998-DECEMBER-04

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<212> DNA

<213> Zea mays

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Pro Asp Lys Phe Arg Val Val Ala Leu Ala Ala Gly Ser Asn Val Thr  
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35 40 45  
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50 55 60  
Thr Leu Ile Ala Gly Gly Pro Phe Val Leu Pro Leu Ala His Lys His  
65 70 75 80  
Lys Val Lys Ile Leu Pro Ala Asp Ser Glu His Ser Ala Ile Phe Gln  
85 90 95  
Cys Ile Gln Gly Leu Ser Glu Gly Ala Leu Arg Arg Ile Ile Leu Thr  
100 105 110  
Ala Ser Xaa Gly Ala Phe Xaa Asp Trp Pro Xaa Asp Arg Leu Lys Asp  
115 120 125  
Val Lys Val Ala Asp Ala Leu Lys His Pro Asn Trp Asn Met Gly Arg  
130 135 140  
Lys Ile Thr Val Asp Ser Ala Thr Leu Phe Asn Lys Gly Leu Glu Val  
145 150 155 160  
Ile Glu Ala His Tyr Leu Phe Gly Ala Glu Tyr Asp Asp Ile Glu Ile  
165 170 175  
Val Ile His Pro Gln Ser Ile Ile His Ser Met Val Glu Thr Gln Asp  
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<213> Oryza sativa

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<213> Oryza sativa

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 20                    25                      30

Leu Pro Phe Gln Thr Arg Asp Arg Arg Ala Val Ser Leu Arg Arg Thr
 35                    40                      45

Cys Cys Ser Met Gln Gln Ala Pro Pro Pro Ala Trp Pro Gly Arg Ala
 50                    55                      60

Val Val Glu Pro Gly Arg Arg Ser Trp Asp Gly Pro Lys Pro Ile Ser
 65                    70                      75                80

Ile Val Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp Ile Val
 85                    90                      95

Ala Glu Asn Pro Asp Lys Phe Arg Val Val Ala Leu Ala Ala Gly Ser
100                    105                      110

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Asn	Val	Thr	Leu	Leu	Ala	Asp	Gln	Val	Lys	Thr	Phe	Lys	Pro	Lys	Leu	115	120	125
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Ala	Asp	Cys	Asp	Trp	Lys	Pro	Glu	Ile	Ile	Pro	Gly	Glu	Gln	Gly	Val	145	150	155
Ile	Glu	Val	Ala	Arg	His	Pro	Asp	Ala	Val	Thr	Val	Val	Thr	Gly	Ile	165	170	175
Val	Gly	Cys	Ala	Gly	Leu	Lys	Pro	Thr	Val	Ala	Ala	Ile	Glu	Ala	Gly	180	185	190
Lys	Asp	Ile	Ala	Leu	Ala	Asn	Lys	Glu	Thr	Leu	Ile	Ala	Gly	Gly	Pro	195	200	205
Phe	Val	Leu	Pro	Leu	Ala	Gln	Lys	His	Lys	Val	Lys	Ile	Leu	Pro	Ala	210	215	220
Asp	Ser	Glu	His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu	Pro	Glu	225	230	235
Gly	Ala	Leu	Arg	Arg	Ile	Ile	Leu	Thr	Ala	Ser	Gly	Gly	Ala	Phe	Arg	245	250	255
Asp	Trp	Pro	Val	Asp	Lys	Leu	Lys	Glu	Val	Lys	Val	Ala	Asp	Ala	Leu	260	265	270
Lys	His	Pro	Asn	Trp	Asn	Met	Gly	Lys	Lys	Ile	Thr	Val	Asp	Ser	Ala	275	280	285
Thr	Leu	Phe	Asn	Lys	Gly	Leu	Glu	Val	Ile	Glu	Ala	His	Tyr	Leu	Phe	290	295	300
Gly	Ala	Glu	Tyr	Asp	Asp	Ile	Glu	Ile	Val	Ile	His	Pro	Gln	Ser	Ile	305	310	315
Ile	His	Ser	Met	Ile	Glu	Thr	Gln	Asp	Ser	Ser	Val	Leu	Ala	Gln	Leu	325	330	335
Gly	Trp	Pro	Asp	Met	Arg	Ile	Pro	Thr	Leu	Tyr	Thr	Met	Ser	Trp	Pro	340	345	350
Asp	Arg	Ile	Tyr	Cys	Ser	Glu	Val	Thr	Trp	Pro	Arg	Leu	Asp	Leu	Cys	355	360	365
Lys	Leu	Gly	Ser	Leu	Thr	Phe	Lys	Ala	Pro	Asp	Asn	Val	Lys	Tyr	Pro	370	375	380
Ser	Met	Asp	Leu	Ala	Tyr	Ala	Ala	Gly	Arg	Ala	Gly	Gly	Thr	Met	Thr	385	390	395
Gly	Val	Leu	Ser	Ala	Ala	Asn	Glu	Lys	Ala	Val	Glu	Leu	Phe	Ile	Asp	405	410	415
Glu	Lys	Ile	Gly	Tyr	Leu	Asp	Ile	Phe	Lys	Val	Val	Glu	Leu	Thr	Cys	420	425	430

Asp Ala His Arg Asn Glu Leu Val Thr Arg Pro Ser Leu Glu Glu Ile  
 435 440 445

Ile His Tyr Asp Leu Trp Ala Arg Glu Tyr Ala Ala Ser Leu Gln Pro  
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Ser Thr Gly Leu Ser Pro Val Pro Val  
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			20					25					30		
Lys	Asp	Ser	Asp	Thr	Thr	Val	Glu	Arg	Arg	Val	Tyr	Cys	Ser	Ala	Ala
		35					40					45			
Ala	Gln	Ser	Pro	Pro	Pro	Ala	Trp	Pro	Gly	Thr	Ala	Ile	Pro	Glu	Pro
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Ser	Asp	Phe	Lys	Thr	Trp	Asp	Gly	Gln	Lys	Pro	Ile	Ser	Val	Leu	Gly
65					70					75					80
Ser	Thr	Gly	Ser	Ile	Gly	Thr	Gln	Thr	Leu	Ser	Ile	Val	Ala	Glu	Phe
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Pro	Glu	Arg	Phe	Lys	Val	Val	Ser	Leu	Ala	Ala	Gly	Ser	Asn	Ile	Thr
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Leu	Leu	Ala	Asp	Gln	Ile	Lys	Thr	Phe	Lys	Pro	Glu	Val	Val	Gly	Leu
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Arg	Asn	Glu	Ser	Leu	Ile	Asp	Glu	Leu	Lys	Glu	Ala	Leu	Ala	Asp	Val
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Asp	His	Lys	Pro	Glu	Ile	Ile	Pro	Gly	Glu	Gln	Gly	Val	Ile	Glu	Ala
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Ala	Gly	Leu	Lys	Pro	Thr	Val	Ala	Ala	Ile	Glu	Ala	Gly	Lys	Asp	Ile
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Ala	Leu	Ala	Asn	Lys	Glu	Thr	Met	Ile	Ala	Gly	Ala	Pro	Phe	Val	Leu
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Pro	Leu	Ala	His	Lys	His	Asn	Ile	Lys	Ile	Leu	Pro	Ala	Asp	Ser	Glu
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His	Ser	Ala	Ile	Phe	Gln	Ser	Ile	Gln	Gly	Leu	Pro	Lys	Gly	Ala	Leu
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Arg	Lys	Ile	Leu	Leu	Thr	Gly	Ser	Gly	Gly	Ala	Phe	Arg	Glu	Trp	Pro
				245					250					255	
Ala	Glu	Lys	Met	Lys	Asp	Ile	Lys	Leu	Ala	Asp	Ala	Leu	Lys	His	Pro
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Ile	Trp	Ser	Leu	Gly	Arg	Lys	Ile	Thr	Ile	Asp	Ser	Ala	Thr	Leu	Phe
		275					280					285			

Asn Lys Gly Leu Glu Val Ile Glu Ala His Tyr Leu Phe Gly Ala Ser  
 290 295 300  
 Tyr Asp Asp Ile Glu Ile Val Ile His Pro Gln Ser Ile Ile His Ser  
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 Leu Val Glu Thr Xaa Asp Ser Ser Val Asn Ala Gln Leu Gly Ile Pro  
 325 330 335  
 Asp Met Arg Leu Pro Leu Leu Tyr Thr Leu Ser Trp Pro Glu Arg Ile  
 340 345 350  
 Tyr Cys Ser Glu Val Thr Trp Pro Arg Leu Asp Leu Ser Lys Tyr Gly  
 355 360 365  
 Ser Leu Thr Phe Tyr Ala Pro Asp Asp Lys Lys Phe Pro Ser Val Asn  
 370 375 380  
 Leu Cys Tyr Ala Ala Gly Arg Ala Gly Gly Thr Met Thr Gly Val Leu  
 385 390 395 400  
 Ser Ala Ala Asn Glu Lys Ala Val Glu Met Phe Val Glu Glu Lys Ile  
 405 410 415  
 Ser Tyr Leu Asp Ile Phe Lys Val Val Glu Leu Thr Cys Gln Glu His  
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 435 440 445  
 Asp Gln Trp Ala Arg Gln Tyr Ala Ala Ser Leu Gln Lys Xaa Phe Lys  
 450 455 460  
 Cys Leu Asn Pro Ile Phe Leu Thr Tyr Phe Arg Ser Trp Gly Cys Gly  
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35 40 45  
Leu Asp Ile Val Ala Glu Asn Pro Asp Lys Phe Lys Val Val Ala Leu  
50 55 60  
Ala Ala Gly Ser Asn Val Thr Leu Leu Ala Asp Gln Val Lys Arg Phe  
65 70 75 80  
Lys Pro Gln Leu Val Ala Val Arg Asn Glu Ser Leu Ile Ala Glu Leu  
85 90 95  
Glu Glu Ala Leu His Asp Val Glu Glu Lys Pro Glu Ile Ile Pro Gly  
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Glu Gln Gly Ile Ile Glu Val Ala Arg His Pro Asp Ala Val Ser Val  
115 120 125  
Val Thr Gly Ile Val Gly Cys Ala Gly Leu Lys Pro Thr Val Ala Ala  
130 135 140  
Ile Glu Ala Gly Lys Asp Ile Ala Leu Ala Asn Lys Glu Thr Leu Ile  
145 150 155 160  
Ala Gly Gly Pro Leu Ser Pro Leu Ala Gln Lys His Asn Val Lys Ile  
165 170 175  
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<213> Triticum aestivum

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agccgctcgtg gaacctgaga ggaggctcgtg ggagggcccc aagcccatct ccatcgtcgg 240  
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attaactgggt tgtgaaagag atccggatta tccctgggga caagtgcata gaggcgcacc 480  
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<212> PRT  
<213> Triticum aestivum

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35 40 45  
Leu Thr Ser Ser Arg Val Val Ala Leu Ala Ala Gly Ser Asn Val Thr  
50 55 60  
Pro Leu Ala Asp Lys Val Lys Thr Phe Lys Pro Asn Trp Val Val Leu  
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Arg Asn Asp Pro Leu Leu Asn Glu Leu Lys Glu Ala Leu Thr  
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<212> DNA  
<213> Triticum aestivum

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<213> Triticum aestivum

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 Pro Arg Leu Asp Leu Cys Lys Leu Gly Ser Leu Thr Phe Lys Ala Pro  
 35 40 45  
 Asp Asn Val Lys Tyr Pro Ser Val Asp Leu Xaa Xaa Tyr Ala Ala Gly  
 50 55 60  
 Arg Ala Gly Gly Thr Met Thr Gly Phe Leu Ser Ala Ala Asn Glu Lys  
 65 70 75 80  
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 <213> Zea mays

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<210> 16  
 <211> 472  
 <212> PRT  
 <213> Zea mays

<400> 16

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Thr	Phe	Gln	Arg	Lys	Gly	Lys	Arg	Ala	Ile	Ser	Leu	Arg	Arg	Thr	Cys	35	40	45	
Cys	Ser	Met	Gln	Gln	Ala	Pro	Pro	Pro	Ala	Trp	Pro	Gly	Arg	Ala	Val	50	55	60	
Ala	Glu	Pro	Gly	Arg	Arg	Ser	Trp	Asp	Gly	Pro	Lys	Pro	Ile	Ser	Ile	65	70	75	80
Val	Gly	Ser	Thr	Gly	Ser	Ile	Gly	Thr	Gln	Thr	Leu	Asp	Ile	Val	Ala	85	90	95	
Glu	Asn	Pro	Asp	Lys	Phe	Arg	Val	Val	Ala	Leu	Ala	Ala	Gly	Ser	Asn	100	105	110	
Val	Thr	Leu	Leu	Ala	Asp	Gln	Val	Lys	Thr	Phe	Lys	Pro	Lys	Leu	Val	115	120	125	
Ala	Val	Arg	Asn	Glu	Ser	Leu	Val	Asp	Glu	Leu	Lys	Glu	Ala	Leu	Ala	130	135	140	
Asp	Cys	Glu	Glu	Lys	Pro	Glu	Ile	Ile	Pro	Gly	Glu	Gln	Gly	Val	Ile	145	150	155	160
Glu	Val	Ala	Arg	His	Pro	Asp	Ala	Val	Thr	Val	Val	Thr	Gly	Ile	Val	165	170	175	
Gly	Cys	Ala	Gly	Leu	Lys	Pro	Thr	Val	Ala	Ala	Ile	Glu	Ala	Gly	Lys	180	185	190	
Asp	Ile	Ala	Leu	Ala	Asn	Lys	Glu	Thr	Leu	Ile	Ala	Gly	Gly	Pro	Phe	195	200	205	
Val	Leu	Pro	Leu	Ala	His	Lys	His	Lys	Val	Lys	Ile	Leu	Pro	Ala	Asp	210	215	220	
Ser	Glu	His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu	Ser	Glu	Gly	225	230	235	240
Ala	Leu	Arg	Arg	Ile	Ile	Leu	Thr	Ala	Ser	Gly	Gly	Ala	Phe	Arg	Asp	245	250	255	
Trp	Pro	Val	Asp	Arg	Leu	Lys	Asp	Val	Lys	Val	Ala	Asp	Ala	Leu	Lys	260	265	270	

His Pro Asn Trp Asn Met Gly Arg Lys Ile Thr Val Asp Ser Ala Thr  
 275 280 285  
 Leu Phe Asn Lys Gly Leu Glu Val Ile Glu Ala His Tyr Leu Phe Gly  
 290 295 300  
 Ala Glu Tyr Asp Asp Ile Glu Ile Val Ile His Pro Gln Ser Ile Ile  
 305 310 315 320  
 His Ser Met Val Glu Thr Gln Asp Ser Ser Val Leu Ala Gln Leu Gly  
 325 330 335  
 Trp Pro Asp Met Arg Leu Pro Ile Leu Tyr Thr Leu Ser Trp Pro Asp  
 340 345 350  
 Arg Ile Tyr Cys Ser Glu Val Thr Trp Pro Arg Leu Asp Leu Cys Lys  
 355 360 365  
 Leu Gly Ser Leu Thr Phe Arg Ala Pro Asp Asn Val Lys Tyr Pro Ser  
 370 375 380  
 Met Asp Leu Ala Tyr Ala Ala Gly Arg Ala Gly Gly Thr Met Thr Gly  
 385 390 395 400  
 Val Leu Ser Ala Ala Asn Glu Lys Ala Val Glu Leu Phe Ile Asp Glu  
 405 410 415  
 Lys Ile Ser Tyr Leu Asp Ile Phe Lys Val Val Glu Leu Thr Cys Asn  
 420 425 430  
 Ala His Arg Asn Glu Leu Val Thr Ser Pro Ser Leu Glu Glu Ile Val  
 435 440 445  
 His Tyr Asp Leu Trp Ala Arg Arg Tyr Ala Ala Ser Leu Gln Pro Ser  
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 Ser Gly Leu Ser Pro Val Pro Ala  
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 <211> 2019  
 <212> DNA  
 <213> Glycine max

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 tttcgctgat tccttcaagt ctaactgcct cacagcaaaa ttctcaggtg ggtttgcttt 180  
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<211> 475
<212> PRT
<213> Glycine max

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Gly Phe Ala Phe Lys Arg Lys Glu Arg Arg Ala Ala Ser Gly Gly Arg
 35          40          45

Val Tyr Cys Ser Val Gln Ala Thr Pro Pro Pro Pro Ala Trp Pro Gly
 50          55          60

Arg Ala Val Pro Glu Gln Gly Arg Lys Thr Trp Asp Gly Pro Lys Pro
 65          70          75          80

Ile Ser Ile Val Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp
 85          90          95

Ile Val Ala Glu Asn Pro Asp Lys Phe Lys Val Val Ala Leu Ala Ala
100          105          110

Gly Ser Asn Val Thr Leu Leu Ala Asp Gln Val Lys Arg Phe Lys Pro
115          120          125

Gln Leu Val Ala Val Arg Asn Glu Ser Leu Ile Ala Glu Leu Glu Glu
130          135          140

Ala Leu His Asp Val Glu Glu Lys Pro Glu Ile Ile Pro Gly Glu Gln
145          150          155          160

Gly Ile Ile Glu Val Ala Arg His Pro Asp Ala Val Ser Val Val Thr
165          170          175

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Gly Ile Val Gly Cys Ala Gly Leu Lys Pro Thr Val Ala Ala Ile Glu  
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 Ala Gly Lys Asp Ile Ala Leu Ala Asn Lys Glu Thr Leu Ile Ala Gly  
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 Gly Pro Phe Val Leu Pro Leu Ala Gln Lys His Asn Val Lys Ile Leu  
 210 215 220  
 Pro Ala Asp Ser Glu His Ser Ala Ile Phe Gln Cys Ile Gln Gly Leu  
 225 230 235 240  
 Pro Glu Gly Ala Leu Arg Arg Val Ile Leu Thr Ala Ser Gly Gly Ala  
 245 250 255  
 Phe Arg Asp Trp Pro Val Asp Lys Leu Lys Asp Val Lys Val Ala Asp  
 260 265 270  
 Ala Leu Lys His Pro Asn Trp Asn Met Gly Lys Lys Ile Thr Val Asp  
 275 280 285  
 Ser Ala Thr Leu Phe Asn Lys Gly Leu Glu Val Ile Glu Ala His Tyr  
 290 295 300  
 Leu Phe Gly Ala Asp Tyr Asp His Ile Glu Ile Val Ile His Pro Gln  
 305 310 315 320  
 Ser Ile Ile His Ser Met Ile Glu Thr Gln Asp Ser Ser Val Leu Ala  
 325 330 335  
 Gln Leu Gly Trp Pro Asp Met Arg Leu Pro Ile Leu Tyr Thr Leu Ser  
 340 345 350  
 Trp Pro Asp Arg Ile Tyr Cys Ser Glu Val Thr Trp Pro Arg Leu Asp  
 355 360 365  
 Leu Cys Lys Leu Gly Ser Leu Thr Phe Lys Thr Pro Asp Asn Val Lys  
 370 375 380  
 Tyr Pro Ser Met Asn Leu Ala Phe Ser Ala Gly Arg Ala Gly Gly Thr  
 385 390 395 400  
 Met Thr Gly Val Leu Ser Ala Ala Asn Glu Lys Ala Val Glu Met Phe  
 405 410 415  
 Ile Asp Glu Lys Ile Ser Tyr Trp Asn Leu Phe Lys Val Val Glu Leu  
 420 425 430  
 Thr Cys Glu Lys His Gln Asn Glu Leu Val Ser Ser Pro Ser Leu Glu  
 435 440 445  
 Glu Ile Ile His Tyr Asp Leu Trp Ala Arg Lys Tyr Ala Ala Ser Leu  
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 Gln Asp Ser Ser Ser Phe Thr Pro Ile Leu Ala  
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<210> 19  
 <211> 1640

<212> DNA  
 <213> *Triticum aestivum*

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 <211> 473  
 <212> PRT  
 <213> *Triticum aestivum*

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 35 40 45  
 Cys Ser Met Gln Gln Gly Pro Pro Pro Ala Trp Pro Gly Arg Ala Val  
 50 55 60  
 Ala Glu Pro Glu Arg Arg Ser Trp Glu Gly Pro Lys Pro Ile Ser Ile  
 65 70 75 80  
 Val Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp Ile Val Ala  
 85 90 95  
 Glu Asn Pro Asp Lys Phe Arg Val Val Ala Leu Ala Ala Gly Ser Asn  
 100 105 110

Val	Thr	Leu	Leu	Ala	Asp	Gln	Val	Lys	Thr	Phe	Lys	Pro	Lys	Leu	Val		
		115					120					125					
Ala	Val	Arg	Asn	Glu	Ser	Leu	Leu	Asn	Glu	Leu	Lys	Glu	Ala	Leu	Ala		
		130					135				140						
Gly	Cys	Glu	Glu	Met	Pro	Glu	Ile	Ile	Pro	Gly	Glu	Gln	Gly	Val	Ile		
		145				150				155					160		
Glu	Val	Ala	Arg	His	Pro	Asp	Ala	Val	Thr	Val	Val	Thr	Gly	Ile	Val		
				165					170					175			
Gly	Cys	Ala	Gly	Leu	Lys	Pro	Thr	Val	Ala	Ala	Ile	Glu	Ala	Gly	Lys		
			180					185					190				
Asp	Ile	Ala	Leu	Ala	Asn	Lys	Glu	Thr	Leu	Ile	Ala	Gly	Gly	Pro	Phe		
		195					200					205					
Val	Leu	Pro	Leu	Ala	His	Lys	His	Asn	Val	Lys	Ile	Leu	Pro	Ala	Asp		
		210				215					220						
Ser	Glu	His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu	Ser	Glu	Gly		
		225			230					235					240		
Ser	Leu	Arg	Arg	Val	Ile	Leu	Thr	Ala	Ser	Gly	Gly	Ala	Phe	Arg	Asp		
				245					250					255			
Trp	Pro	Val	Glu	Lys	Leu	Lys	Asp	Val	Lys	Val	Ala	Asp	Ala	Leu	Lys		
			260					265					270				
His	Pro	Asn	Trp	Ser	Met	Gly	Lys	Lys	Ile	Thr	Val	Asp	Ser	Ala	Thr		
		275					280					285					
Leu	Phe	Asn	Lys	Gly	Leu	Glu	Val	Ile	Glu	Ala	His	Tyr	Leu	Phe	Gly		
		290				295					300						
Ala	Glu	Tyr	Asp	Asp	Ile	Glu	Ile	Val	Ile	His	Pro	Gln	Ser	Ile	Ile		
		305			310					315					320		
His	Ser	Met	Ile	Glu	Thr	Gln	Asp	Ser	Ser	Val	Leu	Ala	Gln	Leu	Gly		
				325					330					335			
Trp	Pro	Asp	Met	Arg	Leu	Pro	Ile	Leu	Tyr	Thr	Leu	Ser	Trp	Pro	Asp		
			340					345					350				
Arg	Val	Tyr	Cys	Ser	Glu	Val	Thr	Trp	Pro	Arg	Leu	Asp	Leu	Cys	Lys		
		355					360					365					
Leu	Gly	Ser	Leu	Thr	Phe	Lys	Ala	Pro	Asp	Asn	Val	Lys	Tyr	Pro	Ser		
		370				375					380						
Val	Asp	Leu	Ala	Tyr	Ala	Ala	Gly	Arg	Ala	Gly	Gly	Thr	Met	Thr	Gly		
		385			390					395					400		
Val	Leu	Ser	Ala	Ala	Asn	Glu	Lys	Ala	Val	Glu	Leu	Phe	Ile	Asp	Glu		
			405						410					415			
Lys	Ile	Ser	Tyr	Leu	Asp	Ile	Phe	Lys	Val	Val	Glu	Met	Thr	Cys	Asp		
			420					425					430				

Ala His Arg Asn Glu Leu Val Thr Arg Pro Ser Leu Glu Glu Ile Ile  
435 440 445

His Tyr Asp Gln Trp Ala Arg Lys Phe Ala Ala Asn Leu Gln Pro Ser  
450 455 460

Ser Ser Gly Arg Ser Pro Val Leu Ala  
465 470

<210> 21

<211> 406

<212> PRT

<213> Arabidopsis thaliana

<400> 21

Ala Pro Arg Gln Ser Trp Asp Gly Pro Lys Pro Ile Ser Ile Val Gly  
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Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu Asp Ile Val Ala Glu Asn  
20 25 30

Pro Asp Lys Phe Arg Val Val Ala Leu Ala Ala Gly Ser Asn Val Thr  
35 40 45

Leu Leu Ala Asp Gln Val Arg Arg Phe Lys Pro Ala Leu Val Ala Val  
50 55 60

Arg Asn Glu Ser Leu Ile Asn Glu Leu Lys Glu Ala Leu Ala Asp Leu  
65 70 75 80

Asp Tyr Lys Leu Glu Ile Ile Pro Gly Glu Gln Gly Val Ile Glu Val  
85 90 95

Ala Arg His Pro Glu Ala Val Thr Val Val Thr Gly Ile Val Gly Cys  
100 105 110

Ala Gly Leu Lys Pro Thr Val Ala Ala Ile Glu Ala Gly Lys Asp Ile  
115 120 125

Ala Leu Ala Asn Lys Glu Thr Leu Ile Ala Gly Gly Pro Phe Val Leu  
130 135 140

Pro Leu Ala Asn Lys His Asn Val Lys Ile Leu Pro Ala Asp Ser Glu  
145 150 155 160

His Ser Ala Ile Phe Gln Cys Ile Gln Gly Leu Pro Glu Gly Ala Leu  
165 170 175

Arg Lys Ile Ile Leu Thr Ala Ser Gly Gly Ala Phe Arg Asp Trp Pro  
180 185 190

Val Glu Lys Leu Lys Glu Val Lys Val Ala Asp Ala Leu Lys His Pro  
195 200 205

Asn Trp Asn Met Gly Lys Lys Ile Thr Val Asp Ser Ala Thr Leu Phe  
210 215 220

Asn Lys Gly Leu Glu Val Ile Glu Ala His Tyr Leu Phe Gly Ala Glu  
225 230 235 240

Tyr Asp Asp Ile Glu Ile Val Ile His Pro Gln Ser Ile Ile His Ser  
 245 250 255  
 Met Ile Glu Thr Gln Asp Ser Ser Val Leu Ala Gln Leu Gly Trp Pro  
 260 265 270  
 Asp Met Arg Leu Pro Ile Leu Tyr Thr Met Ser Trp Pro Asp Arg Val  
 275 280 285  
 Pro Cys Ser Glu Val Thr Trp Pro Arg Leu Asp Leu Cys Lys Leu Gly  
 290 295 300  
 Ser Leu Thr Phe Lys Lys Pro Asp Asn Val Lys Tyr Pro Ser Met Asp  
 305 310 315 320  
 Leu Ala Tyr Ala Ala Gly Arg Ala Gly Gly Thr Met Thr Gly Val Leu  
 325 330 335  
 Ser Ala Ala Asn Glu Lys Ala Val Glu Met Phe Ile Asp Glu Lys Ile  
 340 345 350  
 Ser Tyr Leu Asp Ile Phe Lys Val Val Glu Leu Thr Cys Asp Lys His  
 355 360 365  
 Arg Asn Glu Leu Val Thr Ser Pro Ser Leu Glu Glu Ile Val His Tyr  
 370 375 380  
 Asp Leu Trp Ala Arg Glu Tyr Ala Ala Asn Val Gln Leu Ser Ser Gly  
 385 390 395 400  
 Ala Arg Pro Val His Ala  
 405

<210> 22  
 <211> 475  
 <212> PRT  
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<400> 22  
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 Leu Asp Ser Ser Lys Ser Asn Tyr Asn Leu Asn Pro Leu Lys Phe Gln  
 20 25 30  
 Gly Gly Phe Ala Phe Lys Arg Lys Asp Ser Arg Cys Thr Ala Ala Lys  
 35 40 45  
 Arg Val His Cys Ser Ala Gln Ser Gln Ser Pro Pro Pro Ala Trp Pro  
 50 55 60  
 Gly Arg Ala Phe Pro Glu Pro Gly Arg Met Thr Trp Glu Gly Pro Lys  
 65 70 75 80  
 Pro Ile Ser Val Ile Gly Ser Thr Gly Ser Ile Gly Thr Gln Thr Leu  
 85 90 95  
 Asp Ile Val Ala Glu Asn Pro Asp Lys Phe Arg Ile Val Ala Leu Ala  
 100 105 110

Ala	Gly	Ser	Asn	Val	Thr	Leu	Leu	Ala	Asp	Gln	Lys	Ala	Phe	Lys	Pro		
		115					120					125					
Lys	Leu	Val	Ser	Val	Lys	Asp	Glu	Ser	Leu	Ile	Ser	Glu	Leu	Lys	Glu		
	130					135					140						
Ala	Leu	Ala	Gly	Phe	Glu	Asp	Met	Pro	Glu	Ile	Ile	Pro	Gly	Glu	Gln		
145					150					155					160		
Gly	Met	Ile	Glu	Val	Ala	Arg	His	Pro	Asp	Ala	Val	Thr	Val	Val	Thr		
				165					170						175		
Gly	Ile	Val	Gly	Cys	Ala	Gly	Leu	Lys	Pro	Thr	Val	Ala	Ala	Ile	Glu		
			180					185						190			
Ala	Gly	Lys	Asp	Ile	Ala	Leu	Ala	Asn	Lys	Glu	Thr	Leu	Ile	Ala	Gly		
		195					200					205					
Gly	Pro	Phe	Val	Leu	Pro	Leu	Ala	Lys	Lys	His	Asn	Val	Lys	Ile	Leu		
	210					215					220						
Pro	Ala	Asp	Ser	Glu	His	Ser	Ala	Ile	Phe	Gln	Cys	Ile	Gln	Gly	Leu		
225					230					235					240		
Pro	Glu	Gly	Ala	Leu	Arg	Arg	Ile	Ile	Leu	Thr	Ala	Ser	Gly	Gly	Ala		
				245					250					255			
Phe	Arg	Asp	Leu	Pro	Val	Glu	Lys	Leu	Lys	Glu	Val	Lys	Val	Ala	Asp		
			260					265						270			
Ala	Leu	Lys	His	Ser	Asn	Trp	Asn	Met	Gly	Lys	Lys	Asn	Thr	Val	Arg		
		275					280					285					
Leu	Leu	Gln	Leu	Phe	Phe	Asn	Lys	Gly	Leu	Glu	Val	Ile	Lys	Ala	His		
	290					295					300						
Tyr	Leu	Phe	Gly	Ala	Glu	Tyr	Asp	Asp	Ile	Glu	Ile	Val	Ile	His	Ser		
305					310					315					320		
Pro	Ser	Ile	Ile	His	Ser	Met	Val	Glu	Thr	Gln	Asp	Ser	Ser	Val	Leu		
				325					330					335			
Ala	Gln	Leu	Gly	Trp	Pro	Asp	Met	Arg	Leu	Pro	Ile	Leu	Tyr	Thr	Leu		
			340				345						350				
Ser	Trp	Pro	Glu	Arg	Val	Tyr	Cys	Ser	Glu	Ile	Thr	Trp	Pro	Arg	Leu		
		355					360					365					
Asp	Leu	Cys	Lys	Val	Asp	Leu	Pro	Phe	Lys	Lys	Pro	Asp	Asn	Arg	Glu		
	370					375					380						
Ile	Pro	Ala	Met	Asp	Leu	Ala	Tyr	Ala	Ala	Trp	Lys	Ser	Arg	Ser	Thr		
385					390					395					400		
Met	Thr	Gly	Val	Leu	Ser	Ala	Ala	Asn	Glu	Lys	Ala	Val	Glu	Met	Phe		
				405					410					415			
Ile	Asp	Glu	Lys	Ile	Gly	Tyr	Leu	Asp	Ile	Phe	Lys	Val	Val	Glu	Leu		
			420					425						430			

Thr Cys Asp Lys His Arg Ser Glu Met Ala Val Ser Pro Ser Leu Glu  
435 440 445

Glu Ile Val His Tyr Asp Gln Trp Ala Arg Asp Tyr Ala Ala Thr Val  
450 455 460

Leu Lys Ser Ala Gly Leu Ser Pro Ala Leu Val  
465 470 475